

REMARKS

Upon entry of this amendment claims 18-24 are pending. Claims 1-6 were previously cancelled, claims 7-17 are newly cancelled, and new claims 18-24 are added. A substitute specification is submitted that makes grammatical and punctuation changes. No new matter has been added.

SPECIFICATION

At page 2, the Office Action objects to the specification for grammatical and punctuation errors. Applicant has amended the specification and includes herein a substitute specification addressing the grammatical and punctuation errors noted in the Office Action. In particular, the substitute specification amends the decimal conventions to generally accepted US conventions. Accordingly, Applicant's respectfully request reconsideration and withdrawal of the rejection.

CLAIM OBJECTIONS

At page 3, the Office Action objects to claims 11 and 14 under 37 C.F.R. 1.75(c) as being of improper dependent form. Applicant cancels claims 11 and 14 and submits herein new claims 18-24. Each of claims 19-24 is a proper dependent claim that further limits the subject matter of a previous claim. Thus, Applicant respectfully requests reconsideration and withdrawal of the claim objections.

CLAIM REJECTIONS - 35 U.S.C. § 103

At page 3, the Office Action rejects claims 8-17 under 35 U.S.C. § 103 as obvious over WO 92/08355 (KOSANKE et al.) in view of BIOMETHANATION OF LOW pH PETROCHEMICAL WASTEWATER USING UP-FLOW FIXED-FILM ANAEROBIC BIOREACTORS (PATEL et al.) and HANDBOOK OF HAZARDOUS MATERIALS (FINGAS). Applicant respectfully traverses the rejection.

Although the Office Action formally rejects claims 8-17, Applicant believes that the Office Action actually rejects claims 7-17. Previous claims 7-17 have been canceled, and new claims 18-24 have been added. Claim 24 is a product by process claim. New claims 18-24 distinguish from the teachings of KOSANKE, PATEL and/or FINGAS.

Claims 18 is directed to a method of making a solid carrier based microbial inoculant. Claim 24 is a product by process claim for the solid carrier. The carrier is made of animal bone charcoal, wherein the external surface and/or internal surface and/or internal pores are biologically actively colonized with at least one aerobic soil microorganism produced by a combined liquid and solid state fermentation process, such that biological interactions occur between the carrier and the microorganisms. The references cited in the Office Action fail to teach such a carrier or inoculant.

KOSANKE describes a process for producing a dry bacterial product, the product consisting essentially of a clay

carrier coated with viable bacteria in a dried form. (See, page 4 lines 5-21). The product in KOSANKE reportedly has increased bacterial survival for longer storage periods upon revitalization.

KOSANKE describes culturing a species of bacteria in a growth medium within a conventional fermenter to form a culture. The culture containing the bacteria plus the growth medium is then mixed with an inert powder or granular clay carrier. After continued incubation, the mixture is then air-dried and milled to a powdered form. (See page 5, lines 6-20). The clay carrier reportedly provides a neutral or slightly basic environment which is advantageous for bacterial survival when moisture is subsequently encountered at planting. The clay also provides strong adherence to seed coats, is non-toxic, and will not inhibit growth revitalization. (See page 5, lines 32-39). In contrast to the instant claim, KOSANKE teaches away from utilizing anything besides clay, because "clay provides superior properties upon drying as compared to peat, charcoal, and other commonly used carriers...". (See page 5, lines 23-25).

As featured in instant claim 18, the solid carrier based microbial inoculant made by the claimed method is capable of natural phosphorus supply of plants, biological control of soil born plant pathogens, biological degradation of organic contaminants, and improvement to soil life and fertility. It further comprises phosphorus, and is made of animal bone

charcoal. The clay carrier described in KOSANKE does not comprise phosphorus, and is not made of animal bone charcoal. The clay carrier in KOSANKE is not capable of natural phosphorus supply of plants and is not capable of a biological interaction between the carrier and the microorganisms, all of which are featured in claim 18. Furthermore, as stated above, KOSANKE teaches away from an animal bone charcoal based carrier.

The Office Action relies on PATEL for teaching microorganisms retained on bone char in place of the clay material described by KOSANKE. PATEL describes the anaerobic digestion of waste-water using a fixed-film column reactor. PATEL, however, describes utilizing such a column under anaerobic conditions for waste-water treatment. PATEL fails to teach or suggest any type of column reactor that utilizes aerobic soil microorganisms, or any reactor capable of biological control of soil born plant pathogens, and improvement to soil life and fertility. In addition, PATEL describes a liquid phase bioreactor method (waste-water treatment) and fails to describe any solid state fermentation method as featured in claim 18.

In contrast between PATEL and a carrier produced by the instant claimed method, the liquid phase (waste-water treatment with a high leach out effect, and physico-chemical electrostatic attraction), and the solid phase (microbiological colonization on solid carrier external and internal surface with biological interactions) are very much different mechanisms. For example,

the aerobic soil microorganisms that are biologically actively colonized within the external surface, and/or internal surface, and/or internal pores of the carrier, and the biological interactions that occur between the carrier and the microorganisms, are different in a solid phase versus the liquid phase described in PATEL. For all these reasons, one of ordinary skill in the art would not substitute the bone char described in the anaerobic digestion of waste-water method of PATEL, with the clay material described in KOSANKE.

The solid carrier of instant claim 18 is also nitrogen free, and free from any heavy metal or organic/inorganic contamination which can inhibit microbial activity. The solid carrier is manufactured at a temperature greater than 700°C in the absence of oxygen. This is important for the production of a carrier free from nitrogen and organic/inorganic contamination. Standard and traditionally manufactured bone charcoal, such as that described in PATEL, and described in FINGAS, are not nitrogen free and may contain heavy metal or organic/inorganic contamination which can inhibit microbial activity.

PATEL further describes utilizing bone char as a carrier that can withstand higher hydraulic and organic loadings. This may be due to its physical characteristics. As a support material for biomass development and attachment, the bone char is able to show high physico-chemical interaction, such as electrostatic attraction. PATEL, however, fails to teach or

suggest the development of a biological interaction between the carrier and the microorganisms as featured in claim 18.

For at least these reasons, KOSANK, PATEL and/or FINGAS, alone or in combination, fail to teach or suggest, and would not have rendered obvious, the method of manufacturing a solid carrier-based microbial inoculant having all of the features as recited in claim 18. Each of claims 19-23 depends directly or indirectly from claim 18 and claim 24 is a product by process claim directed to a carrier manufactured by that method, and for at least the same reasons would also have not been obvious. Accordingly, Applicant respectfully requests reconsideration and withdrawal of the rejection.

CONCLUSION

Entry of the above amendments is earnestly solicited. Applicant respectfully requests that a timely Notice of Allowance be issued in this case.

Should there be any matters that need to be resolved in the present application, the Examiner is respectfully requested to contact the undersigned at the telephone number listed below.

The Commissioner is hereby authorized in this, concurrent, and future submissions, to charge any deficiency or credit any overpayment to Deposit Account No. 25-0120 for any

additional fees required under 37 C.F.R. § 1.16 or under 37
C.F.R. § 1.17.

Respectfully submitted,

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APPENDIX:

The Appendix includes the following item(s):

- ☒ - a new or amended Abstract of the Disclosure
- ☒ - a Substitute Specification and a marked-up copy of the originally-filed specification